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(54) A method for reducing power consumed by a computer.

(57) A low power management system monitors software application programs for keyboard activity so as to turn off the microprocessor in the computer in response to a loop (10,16) looking for a keypress and certain other loops which can be monitored without use of the microprocessor.

A low power management system including both hardware (Figure 2) and software (Figure 5) is provided for a battery powered portable computer (not shown). The low power management system powers down various sections (10,12,16,21,24) of the computer (DMA, VCO, DISPLAY, UART) when they are not used. The low power management system is controlled by a control program directing the microprocessor (40) (Figure 2) of the computer, and includes the capability to turn off clock signals (not shown) to the various sections of the computer based upon demand. Also included is the capability to turn on clock signals based upon demand. The low power management system also includes the capability to turn on the computer upon a press of a key on the computer keyboard.

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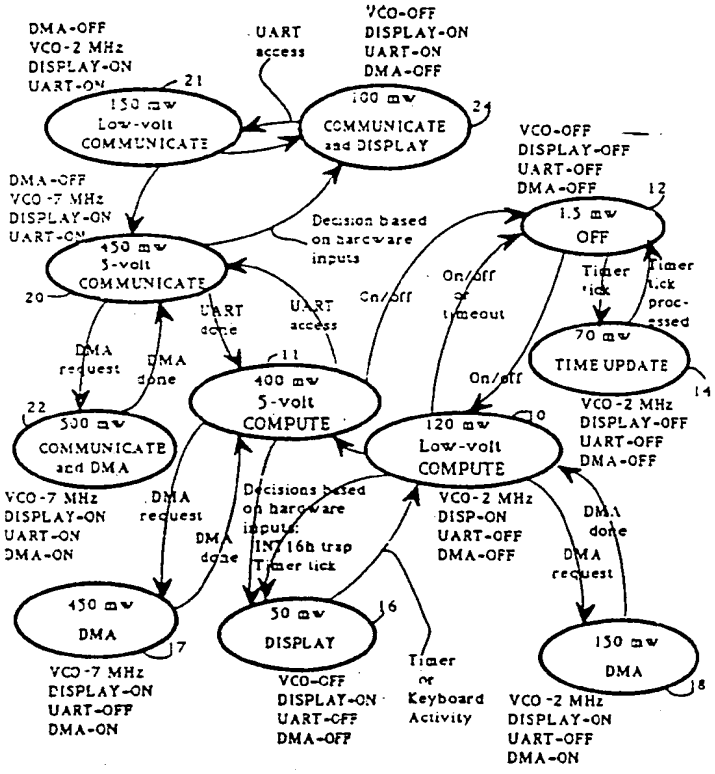
DMA-OFF
VCO-2 MHz
DISPLAY-ON
UART-ON
21
150 mw
Low-volt
COMMUNICATE
UART
access
VCO-OFF
DISPLAY-ON
UART-ON
DMA-OFF
100 mw
COMMUNICATE
and DISPLAY
24
VCO-OFF
DISPLAY-OFF
UART-OFF
DMA-OFF
12
1.5 mw
OFF
DMA-OFF
VCO-7 MHz
DISPLAY-ON
UART-ON
450 mw
5-volt
COMMUNICATE
20
Decision based
on hardware
inputs
On/off
On/off
or
timeout
Timer
tick
Timer
tick
proc-
essed
70 mw
TIME UPDATE
14
VCO-2 MHz
DISPLAY-OFF
UART-OFF
DMA-OFF
UART
done
UART
access
DMA
request
DMA
done
11
400 mw
5-volt
COMPUTE
On/off
22
500 mw
COMMUNICATE
and DMA
10
120 mw
Low-volt
COMPUTE
VCO-7 MHz
DISPLAY-ON
UART-ON
DMA-ON
DMA
request
DMA
done
Decisions based
on hardware
inputs:
INT 16h trap
Timer tick
VCO-2 MHz
DISP-ON
UART-OFF
DMA-OFF
DMA
done
DMA
request
450 mw
DMA
7
50 mw
DISPLAY
16
150 mw
DMA
18
VCO-7 MHz
DISPLAY-ON
UART-OFF
DMA-ON
VCO-OFF
DISPLAY-ON
UART-OFF
DMA-OFF
Timer
or
Keyboard
Activity
VCO-2 MHz
DISPLAY-ON
UART-OFF
DMA-ON

Figure 1

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 11 0662

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
Y	EP-A-0 303 020 (SHARP KABUSHIKI KAISHA) 15 February 1989 * column 2, line 18 - line 45; figure 2 *	13,16,18	G06F1/32 G06F1/08
Y	PATENT ABSTRACTS OF JAPAN vol. 008 no. 008 (E-221) ,13 January 1984 & JP-A-58 171842 (MATSUSHITA DENSHI KOGYO KK) 8 October 1983, * abstract *	13,16,18	
A	HEWLETT-PACKARD JOURNAL, vol. 37, no. 7, July 1986 PALO ALTO US, pages 4-13, EATON J. T. 'Design of HP's Portable Computer Entity' * page 10, left column, line 1 - page 11, left column, line 34 *	1,4,5,7, 8,10,11	
P,A	PATENT ABSTRACTS OF JAPAN vol. 014 no. 321 (P-1074) ,10 July 1990 & JP-A-02 105213 (MITSUBISHI ELECTRIC CORP) 17 April 1990, * abstract *	13,18	

TECHNICAL FIELDS SEARCHED (Int.Cl.5)

G06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 September 1995	Bailas, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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